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PERFORMANCE STANDARDS

STRUCTURAL AND INSULATION REQUIREMENTS

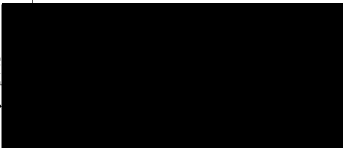
FOR HOUSES

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HOUSING AND HOME FINANCE AGENCY

TECHNICAL OFFICE

WASHINGTON 25, D. C.



FOREWORD

Today's overwhelming need for an increased volume of housing at lower cost has accentuated the importance of developing new materials and construction techniques. During the past few years a great deal has been accomplished in this direction. However, there has been no uniform basis for the evaluation of these developments. Unless the acceptance and use of new products and systems of construction are accelerated, we will not obtain the full benefit of all the new developments in housing. The widespread adoption of uniform performance standards by which the merits of new materials and building techniques can be judged and accepted for use is a logical step toward this goal. This document, which sets forth such standards for structural and insulation requirements for houses, will serve as a guide in the modernization of building codes and will assist manufacturers and builders in the development of sound new building techniques.

RAYMOND M. FOLEY,
Administrator, National Housing Agency.

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INTRODUCTION

This document supplements BMS107 Building Code Requirements for New Dwelling Construction, recommended by the National Housing Agency and prepared in consultation with the National Bureau of Standards, issued January 1, 1947. More particularly, it implements Section 102, "Materials and Methods not Specifically Authorized" by providing a "yardstick" for evaluating such materials and methods on a uniform basis.

Impetus was given the preparation of this document by the great number and variety of problems for which the only logical solution is a nationally accepted set of performance standards. It is intended for use by building officials, manufacturers, architects, engineers, testing laboratories, and others interested in housing. It is a forward step in the program of modernizing building codes to keep pace with progressive developments in dwelling construction. The greater the acceptance and use of uniform performance standards, the greater will be the resultant benefits. And, such benefits should be comparable with those which have always followed the adoption of standards by other industries.

In many codes, acceptable materials and constructions are stated in terms of types, grades, dimensions, spacings, mixes or similar requirements. Some codes contain provisions for the procedure whereby approval of new materials and constructions are given. However, such procedures do not set forth the performance standards under which submissions are judged for approval.

Well-known materials are now being used in new ways. New materials are being introduced. New methods of combining materials are being evolved. Some of these are based upon conventional materials and structural designs fabricated under new methods. They all pose new problems of greater or lesser magnitude.

Extensive research of engineering data and test reports is reflected in this document. It has been prepared by the Building Regulations and Construction Standards Branch, in collaboration with the Engineering Branch of the Technical Office serving the Office of the Housing Expediter and the National Housing Agency, and in consultation with staff members of the constituent housing agencies and Federal agencies, technical and engineering societies, trade associations, and professional engineers. Several drafts have been circulated for comments and criticisms. The degree of interest was evidenced by the large number of comments received. All comments and suggestions have been carefully considered.

Much reliance is placed upon commonly accepted and recognized data. The various test loading procedures are those set forth in "Building Materials and Structures Reports" of the National Bureau of Standards, and reports and recommendations of other nationally recognized authorities. While these loadings do not necessarily simulate actual service conditions in all cases, they are considered to be equitable means of evaluating dwelling construction.

The wind and snow maps in the Appendix are the same as those in the Appendix to American Standard Building Code Requirements for Minimum Design Loads in Buildings and Other Structures, A58.1-1945, approved May 22, 1945, by the American Standards Association. The factors used in computing wind loads on wall and roof elements stem from the data used in preparing A58.1. However, inasmuch as the velocity pressures set forth in A58.1 are those at 30 feet above ground, and because this height is greater than that of the average dwelling, the seventh root law for the variation of wind velocity with height above ground has been projected to determine velocity pressures at levels less than 30 feet above ground.

GENERAL

Scope.—The requirements of this document apply to dwellings not over two and one-half stories in height containing one or two dwelling units, and not over two stories in height containing more than two dwelling units, and accessory structures, such as garages.

Definitions.—For the purpose of this document—

1. "Component" means a part or member of an element.
2. "Element" means any floor, wall, partition, ceiling or roof.
3. "Element covering" means any material, or combination of materials, spanning between structural members or ribs. It does not include applied protective or wearing coverings such as paint, linoleum, roofing, etc.
4. "Dead load" means the weight of elements and other permanent portions of the dwelling.
5. "Live load" means all loads other than dead load.
6. "Design loading" means total of dead and live loads, as used in design calculations.
7. "Span" means clear span of element, or between ribs of ribbed elements.
8. "Sustaining of load" means such sustaining without cracking, breaking, or permanent buckling of principal structural components.
9. "Residual deflection" means the "deflection," etc., (set) remaining after removal of load, generally expressed as a percentage of the maximum deflection, etc., under load.

indentation"	tion," etc., (set) re-
displacement"	maining after re-
vertical shortening"	moval of load, gen-
lateral deflection"	erally expressed as
	a percentage of the
	maximum deflection,
	etc., under
	load.

Physical properties of materials shall conform to nationally recognized standards, or in the absence of such, shall be determined by appropriate tests. The necessity for, and kinds of tests required will depend on:

- (a) Type of material, or combination or assembly of materials,
- (b) Proposed use, and
- (c) Physical properties in question.

Working stresses used in calculations shall conform to nationally recognized standards, or in the absence of such, shall be based on results of tests interpreted in accordance with professional judgment and good engineering practice, taking into account the variability of test results.

Testing procedures.—Tests made substantially in accordance with procedures of:

- (a) The National Bureau of Standards, Washington, D. C., or
- (b) The Forest Products Laboratory, Madison, Wis., or
- (c) The American Society for Testing Materials, Philadelphia, Pa., or
- (d) other nationally recognized authorities

shall be considered as made in accordance with nationally recognized standards.

Strength of elements shall be determined by any of the following methods:

- (a) Structural analysis based on nationally recognized engineering procedures,
- (b) Comparison with other constructions for which strengths have been determined under (a) above or (c) below.

(c). Tests—made in accordance with *Testing procedures* above. If characteristics are such as to indicate need—tests shall also be made under:

- (1) Temperatures ranging from -20° F. to $+200^{\circ}$ F., and relative humidities ranging up to 100 percent; and
- (2) Temperatures ranging from 65° F. to 75° F., and relative humidities from 60 to 70 percent, continued until a condition of stability has been reached.

Factors of 1 and 2 may be substituted for factors of $1\frac{1}{4}$ and $2\frac{1}{4}$, respectively; see

101.12 (b), 101.22 (b), 102.12 (b), 102.22, 102.32 (b), 102.42 (b), 103.12 (b), 103.22, 103.32 (b), 103.42 (b), 104.12 (b), 104.22 (b), 105.12 (b), 105.22 (b)

provided elements are such that no significant additional deflection or deformation occurs due to application of load continued for 24 hours.

Joints, fastenings and connections shall be such as will effectively transmit 2 or $2\frac{1}{4}$ times the design loadings, as the case may be.

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STRUCTURAL REQUIREMENTS

FLOORS

101.1 *Uniform live load*

101.11 Requirements—

- (a) 40 pounds per square foot—for all habitable stories, except
- (b) 30 pounds per square foot—for habitable stories above first in single-family dwellings, including habitable area of any attic of such cross-section as will permit use for habitable rooms having at least:
 - (1) 7½-foot ceiling height for one-half of floor area; and
 - (2) 5-foot height under sloping ceilings; and
 - (3) 7-foot width in at least 90 percent of area.
- (c) 20 pounds per square foot for attics, other than attics as set forth in (b), which will permit use for light storage.

101.12 Acceptable performances—

- (a) Under live load—maximum deflections—
 - (1) $\frac{1}{360}$ of span—if underside is to be plaster; or
 - (2) $\frac{1}{240}$ of span—if underside is other than plaster, or unfinished; but
 - (3) $\frac{1}{2}$ inch in any case.
- (b) Under uniform load (or equivalent) consisting of superimposed load equal to $1\frac{1}{4}$ times dead load plus $2\frac{1}{4}$ times live load:
 - (1) sustaining of load; and
 - (2) 25 percent maximum residual deflection.

101.2 *Concentrated load*

101.21 Requirements—

Load applied on 1-inch disk on upper surface at point where greatest deflection or indentation, or both, will occur—

- (a) 250 pounds for all habitable stories, for:
 - (1) element span; and
 - (2) span between ribs, in ribbed elements.
- (b) 150 pounds for attics for light storage—span of element only (applied over rib in ribbed element).

101.22 Acceptable performances—

- (a) Under load—maximum deflections or indentations—
 - Span of element—
 - (1) $\frac{1}{360}$ —if underside is to be plaster; or
 - (2) $\frac{1}{240}$ —if underside is other than plaster, or unfinished; but
 - (3) $\frac{1}{2}$ inch in any case.
 - Span between ribs—ribbed elements—
 - (4) $\frac{1}{240}$ or $\frac{1}{16}$ inch, whichever is greater.

- (b) Under $2\frac{1}{4}$ times load—

- (1) sustaining of load; and
- (2) 25 percent maximum residual deflection or indentation, or both.

101.3 *Impact load*

101.31 Requirements—

10-inch diameter sand bag weighing 60 pounds, dropped on upper surface, at weakest point of element.

101.32 Acceptable performances—

- (a) Under 4-foot drop—no residual deflection.
- (b) Under 6-foot drop—
 - (1) 25 percent maximum residual deflection; and
 - (2) no break through element covering.

WALLS

102.1 *Wind load*

102.11 Requirements—

Live load, applied transversely, acting inward or outward:

- (a) 15 pounds per square foot, or
- (b) Load calculated by multiplying applicable value as shown on Wind Velocity Pressure Map (see Appendix) by the following factors¹—
 - 0.9 For walls of first story,
 - 1.1 For walls of second story,
 - 1.2 For walls above second story, up to two-and-one-half stories;
 whichever is greater, (a) or (b).

102.12 Acceptable performances—

- (a) Under live load—maximum deflections—
 - (1) $\frac{1}{360}$ of span—if interior surface is to be plaster; or
 - (2) $\frac{1}{240}$ of span—if interior surface is other than plaster.
- (b) Under $2\frac{1}{4}$ times live load—
 - (1) sustaining of load; and
 - (2) 25 percent maximum residual deflection.

102.2 *Vertical load*

102.21 Requirements—

Live load, acting within a plane not more than one-third of wall thickness from interior surface:

- (a) 500 pounds per linear foot; or
 - (b) Load resulting from imposed design loadings;
- whichever is greater (a) or (b).

102.22 Acceptable performances—

- Under $2\frac{1}{4}$ times live load—
 - (1) sustaining of load; and
 - (2) 40 percent maximum residual vertical shortening or lateral deflection, or both.

¹ Includes exterior and interior factors.

- 102.3 *Racking load*
 102.31 Requirements—
 Live load, acting along upper edge of wall—
 (a) 100 pounds per linear foot; or
 (b) load resulting from wind;
 whichever is greater (a) or (b).
- 102.32 Acceptable performances—
 On wall 8 feet long and 8 feet high:
 (a) Under live load— $\frac{1}{8}$ inch maximum displacement.
 (b) Under $2\frac{1}{4}$ times live load:
 (1) Sustaining of load; and
 (2) 25 percent maximum residual displacement.
- 102.4 *Concentrated load*
 102.41 Requirements—
 40 pounds applied on 1 inch disk on either surface where greatest deflection or indentation, or both, will occur.
- 102.42 Acceptable performances—
 (a) Under load—maximum deflections or indentations—
 Span between ribs—ribbed elements—
 (1) $\frac{1}{120}$ plus $\frac{1}{10}$ inch, interior surface.
 (2) $\frac{1}{120}$ or $\frac{1}{8}$ inch, whichever is greater, exterior surface.
 In any case—
 (3) $\frac{1}{32}$ inch residual indentation—interior surface.
 (4) $\frac{1}{64}$ inch residual indentation, exterior surface.
 (b) Under $2\frac{1}{4}$ times load:
 (1) sustaining of load; and
 (2) 25 percent maximum residual deflection or indentation, or both.
- 102.5 *Impact load*
 102.51 Requirements—
 10-inch diameter sand bag weighing 60 pounds, dropped on either surface at weakest point of element. **(not element covering)**
- 102.52 Acceptable performances—
 Span of element:
 (a) Under $1\frac{1}{2}$ foot drop—
 no residual deflection.
 (b) Under 3 foot drop—
 25 percent maximum residual deflection.

PARTITIONS

- 103.1 *Wind load*
 103.11 Requirements—
 15 pounds per square foot live load, applied transversely.
- 103.12 Acceptable performances—
 (a) Under live load—maximum deflections—
 (1) $\frac{1}{360}$ of span if either surface is to be plaster; or
 (2) $\frac{1}{240}$ of span if neither surface is plaster.
 (b) Under $2\frac{1}{4}$ times live load:
 (1) sustaining of load; and
 (2) 25 percent maximum residual deflection.
- 103.2 *Vertical load*—Not applicable to nonbearing partitions.

- 103.21 Requirements—
 Live load, acting within a plane not more than one-third of partition thickness from surface:
 (a) 500 pounds per linear foot; or
 (b) load resulting from imposed design loadings;
 whichever is greater (a) or (b).
- 103.22 Acceptable performances—
 Under $2\frac{1}{4}$ times live load—
 (1) sustaining of load; and
 (2) 40 percent maximum residual vertical shortening or lateral deflection, or both.
- 103.3 *Racking load*—Not applicable to nonbearing partitions.
- 103.31 Requirements—
 Live load, acting along upper edge of partition:
 (a) 100 pounds per linear foot; or
 (b) load resulting from wind;
 whichever is greater (a) or (b).
- 103.32 Acceptable performances—
 On partition 8 feet long and 8 feet high.
 (a) Under live load— $\frac{1}{8}$ inch maximum displacement.
 (b) Under $2\frac{1}{4}$ times live load—
 (1) sustaining of load; and
 (2) 25 percent maximum residual displacement.
- 103.4 *Concentrated load*
 103.41 Requirements—
 40 pounds applied on 1 inch disk, on either surface where greatest deflection or indentation, or both, will occur.
- 103.42 Acceptable performances—
 (a) Under load—maximum deflections or indentations—
 Span between ribs—ribbed elements—
 (1) $\frac{1}{120}$ plus $\frac{1}{10}$ inch—either surface.
 In any case—
 (2) $\frac{1}{32}$ inch residual indentation—either surface.
 (b) Under $2\frac{1}{4}$ times load—
 (1) sustaining of load; and
 (2) 25 percent maximum residual deflection or indentation, or both.

- 103.5 *Impact load*
 103.51 Requirements—
 10 inch diameter sand bag weighing 60 pounds, dropped on either surface at weakest point of element. **(not element covering)**
- 103.52 Acceptable performances—
 Span of element:
 (a) Under $1\frac{1}{2}$ foot drop—
 no residual deflection.
 (b) Under 3 foot drop—
 25 percent maximum residual deflection.

CEILINGS

- 104.1 *Uniform load*
 104.11 Requirements—
 In any dwelling in which space above ceiling cannot be used for—

Habitable rooms—see 101.11 (b); or
 Light storage—see 101.11 (c);
 no live load need be assumed for ceiling element.
 In any case other than as set forth above, the
 ceiling surface is the underside of a:

- Floor element, or
- Roof element;

therefore, it is subject to the requirements of the
 element of which it is a component.

104. 12 Acceptable performances—

(a) Under dead load—maximum deflections:

- (1) $\frac{1}{360}$ of span if surface is to be plaster, or
- (2) $\frac{1}{240}$ of span if surface is other than plaster; but
- (3) $\frac{1}{2}$ inch in any case.

(b) Under superimposed load of $1\frac{1}{4}$ times dead
 load—

- (1) sustaining of load; and
- (2) 25 percent maximum residual deflection.

104. 2 Concentrated load

104. 21 Requirements—

40 pounds applied on 1-inch disk on ceiling sur-
 face where greatest deflection or indentation, or
 both, will occur.

104. 22 Acceptable performances—

(a) Under load—maximum deflections or in-
 dentations—

Span between ribs—ribbed elements—

- (1) $\frac{1}{120}$ plus $\frac{1}{40}$ inch—either surface.

In any case—

- (2) $\frac{1}{32}$ inch—residual indentation—either
 surface.

(b) Under $2\frac{1}{4}$ times load—

- (1) sustaining of load; and
- (2) 25 percent maximum residual deflection
 or indentation, or both.

ROOFS

105. 1 Wind and snow loads—Acting separately or in
 combination—

105. 11 Requirements—

Live loads—

(a) Minima—

- (1) 20 pounds per square foot of horizontal
 projection acting downward and vertically
 for slopes of 40° or less.

- (2) 12 pounds per square foot of roof act-
 ing inward and normal to slope for slopes
 greater than 40° .

- (3) 15 pounds per square foot of roof act-
 ing outward and normal to slope for all
 slopes.

(b) Where live loads caused by wind and snow
 exceed the above minima, they shall be com-
 puted as follows—

- (1) Wind load, uniformly distributed, act-
 ing normal to slope of roof—Multiply lo-
 cality value, as shown on Wind Velocity

Pressure Map (see Appendix), by applicable
 factor below—

Direction of force	Num- ber of stories	Factor (including exterior plus interior) ¹				
		Slope				
		0 to 20°	30°	40°	50°	60° or more
Inward	1 2	0 0	0.37 .42	0.53 .61	0.70 .80	0.86 .98
Outward	1 2	Any slope				
		1.15 1.32				

¹ Interpolate for
all other slopes.

(2) Snow load—uniformly distributed, act-
 ing vertically on the horizontal projection—
 Multiply locality value, as shown on Snow
 Load Map (see Appendix), by applicable
 factor below:

Slope	Factor ¹
0 to 30°	1.0
40°	.67
50°	.33
60°	0.00

¹ Interpolate for all other
slopes

(3) Combined load—wind, snow, and dead
 loads may be reduced 25 percent, for design
 at normal working stresses, provided the
 resultant load is not less than—

Snow and dead load; or

Wind and dead load; or

Load as set forth in (a) (1), (2), or (3),
 above, plus dead load.

105. 12 Acceptable performances—

(a) Under live load—maximum deflections—

- (1) $\frac{1}{360}$ of span—if underside is to be
 plaster; or

- (2) $\frac{1}{240}$ of span—if underside is other than
 plaster; or

- (3) $\frac{1}{180}$ of span if underside is unfinished.

(b) Under uniform load (or equivalent) con-
 sisting of superimposed load equal to $1\frac{1}{4}$
 times dead load plus $2\frac{1}{4}$ times live load—

- (1) sustaining of load; and
- (2) 25 percent maximum residual deflection.

105.2 *Concentrated load*

105.21 *Requirements—*

Load applied on 1-inch disk, normal to upper surface, where greatest deflection or indentation, or both, will occur—

- (a) 200 pounds—slopes of 10° or less; or
- (b) 150 pounds—slopes greater than 10° and less than 20°; or
- (c) 100 pounds—slopes of 20° or more, for
 - (1) Span of element; and
 - (2) Span between ribs, of ribbed elements.

105.22 *Acceptable performances—*

(a) Under load—maximum deflections or indentations—

Span of element—

- (1) $\frac{1}{360}$ —if underside is to be plaster; or
- (2) $\frac{1}{240}$ —if underside is other than plaster; or
- (3) $\frac{1}{180}$ —if underside is unfinished.

Span between ribs—ribbed element—

- (4) $\frac{1}{180}$ or $\frac{1}{12}$ inch—whichever is greater.

In any case—

- (5) $\frac{1}{64}$ inch residual indentation.

(b) Under $2\frac{1}{4}$ times load—

- (1) sustaining of load; and
- (2) 25 percent maximum residual deflection or indentation, or both.

105.3 *Impact load*

105.31 *Requirements—*

10-inch diameter sand bag weighing 60 pounds dropped on upper surface at weakest point of element.

105.32 *Acceptable performances—*

(a) Under 1½-foot drop—

no residual deflection.

(b) Under 3-foot drop—

- (1) 25 percent maximum residual deflection; and
- (2) no break through element covering.

INSULATION REQUIREMENTS

201. *Resistance to heat loss.*

Means to reduce the heat loss of the dwelling, if necessary to attain compliance with Section 202 shall be provided. Such means may include—

- (a) Thermal insulation of exposed elements.
- (b) Weather stripping—permanently installed.
- (c) Caulking.
- (d) Storm sash, storm doors or double glazing.

202. *Limitations to heat loss.*

(a) The heat loss of the dwelling in B.t.u. per hour (exclusive of unfinished enclosed spaces) shall not exceed 60 times the total number of square feet of floor area. For purposes of calculation the floor area shall be measured to the inside faces of enclosing walls.

(b) The maximum acceptable coefficients of heat transmission are as follows:

- (1) Walls, exposed to outdoor temperatures

$$U = \frac{18}{70 - D}$$

- (2) Floors over unheated space

$$U = \frac{24}{70 - D}$$

(c) Floor slabs on ground under habitable rooms shall have moisture and vermin proof insulation around the perimeter, of maximum acceptable conductance as follows:

- (1) Ordinary slab floor on ground

$$C = \frac{48}{70 - D}$$

- (2) Slab floors used as radiant heating panels

$$C = \frac{32}{70 - D}$$

203. *Calculations of heat loss.*

Calculation of heat losses shall be based on the following—

(a) Data and methods set forth in the current edition of "Heating Ventilating Air Conditioning Guide," published by the ASHVE except as modified by Sections 204 and 205.

(b) Inside temperatures 70° F.

(c) Outside design temperatures (D in the formulae in Section 202) as recommended in the "Guide" or as dictated by established local practice.

204. *Tests.*

Tests shall be made to determine coefficients of heat transmission of materials or elements for which such data is not available.

205. *Testing procedures.*

Tests for coefficients of heat transmission shall be made substantially in accordance with the procedures of the National Bureau of Standards, Washington, D. C., by either the hot plate method for homogenous materials, or by the guarded hot box method for built-up or laminated sections or elements. Certified reports by nationally recognized testing laboratories shall be acceptable.

APPENDIX A						ACCEPTABLE PERFORMANCES															
TABULATION OF STRUCTURAL REQUIREMENTS						Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion	
indicates acceptable performance						Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion		Deflec- tion	
LOADS						FLOOR		WALL		PARTITION		CEILING		ROOF		see text		see text		see text	
UNIFORM - lbs. per sq. ft.						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
40 - 30 - 20						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
20 - 12 - 15 or calculated						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
1-1/4 Dead - 2-1/4 Live						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
Dead Load						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
1-1/4 Dead load						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
15 or calculated						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
15						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
2-1/4 Live load						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
CONCENTRATED - lbs. 1 in.						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
250 habitable stories						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
150 attics-for light stor.						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
50 exterior surface						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
50 interior "						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
50 either "						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
50 ceiling surface						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
200 10° or less						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
150 over 10° - less than 20°						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
100 20° or more						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
2-1/4 Live load						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
IMPACT - 10 in. 60 lb. bag						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
4 ft. drop						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
6 " "						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
1-1/2 " "						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
3 " "						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
3 ft. drop						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
VERTICAL - lbs. per lin. ft.						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
500 - or actual						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
2-1/4 Live load						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
RACKING - lbs. per lin. ft.						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
100 - or actual						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
2-1/4 Live load						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
1/8 in. maximum displacement						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
25% residual displacement						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
1/8 in. maximum displacement						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	
25% residual displacement						1/360		1/240		1/240		underside		1/180		unfinished		1/2 in. in any case		Sustaining of load	

WIND VELOCITY PRESSURE (LBS. PER SQ. FT.)

APPENDIX B WIND VELOCITY PRESSURE MAP

